


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

GROUND-WATER DATA FOR 1976-77 IN
JOSHUA TREE NATIONAL MONUMENT, CALIFORNIA

Open-File Report 78-854

Prepared in cooperation with the
National Park Service



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By D. J. Downing

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Menlo Park, California
October 1978

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CONVERSION FACTORS

For readers who prefer metric units rather than U.S. customary units, the conversion factors for the terms used herein are listed below:

<u>Multiply U.S. customary unit</u>	<u>By</u>	<u>To obtain metric unit</u>
acres	4.047×10^{-1}	hectares
acre-ft (acre-feet)	1.233×10^{-3}	cubic hectometers
ft (feet)	3.048×10^{-1}	meters
gal (gallons)	3.785	liters
in (inches)	2.540	centimeters
mi (miles)	1.609	kilometers

GROUND-WATER DATA FOR 1976-77 IN JOSHUA TREE NATIONAL MONUMENT,
CALIFORNIA

By J. D. Downing

ABSTRACT

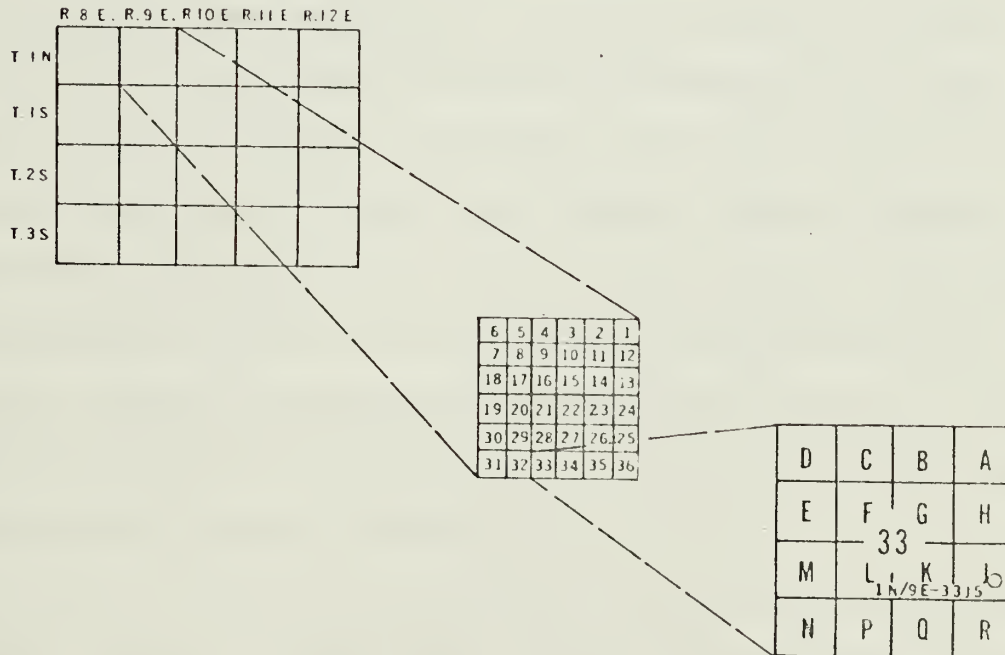
A continuing study of ground water in Joshua Tree National Monument shows that during 1976-77 water levels fluctuated seasonally; slight declines were detected in the Oasis of Mara and the Pinto Basin. Water quality was generally good, with a high concentration of fluoride in one well in the southern part of the Monument.

INTRODUCTION

This report, prepared at the request of the National Park Service, is part of a continuing inventory by the U.S. Geological Survey of general geohydrologic conditions at Joshua Tree National Monument (fig. 1). The report includes chemical analyses of ground water from two wells (table 1), pumpage by Kaiser Steel Corp. from Pinto Basin (table 2), yearly pumpage by Kaiser Steel Corp. (table 3), and water-level measurements in observation wells in the monument (table 4). Data on pumpage and on water levels before the period of this report were published in Geological Survey Water-Supply Paper 1475-0 (Kunkel, 1963) and in previous annual reports to the National Park Service.

WELL-NUMBERING SYSTEM

The well-numbering system used by the Geological Survey in California indicates the location of wells according to the rectangular system for the subdivision of public land. For example, in the well number 1N/9E-33J5 that part of the number preceding the slash indicates the township (T. 1 N.); the number following the slash indicates the range (R. 9 E.); the number following the hyphen indicates the section (sec. 33); and the letter following the section number indicates the 40-acre subdivision of the section according to the lettered diagram below. The final number is a serial number for wells in each 40-acre subdivision.



WATER QUALITY

Water samples were collected for chemical analysis during November 1976 and October 1977 from well 2S/8E-21G1 (NPS Lost Horse No. 1), which is currently unused, and well 4S/11E-27Q1 (NPS Cottonwood well), which provides water for public supply in the Cottonwood Spring area. The water samples were analyzed in 1976 by the Geological Survey laboratory in Denver, Colo., and in 1977 by the California Department of Water Resources laboratory in Bryte, Calif. These analyses are in table 1.

In general, the water from these two wells is a calcium sodium bicarbonate type; the concentration of dissolved solids is less than 300 mg/L (milligrams per liter). The chemical quality of the water from these wells is good except for the fluoride concentration in well 4S/11E-27Q1. In 1977 this concentration was 3.1 mg/L, which exceeds the recommended limit for drinking water (National Academy of Sciences, National Academy of Engineers, 1972, p. 66) by 1.7 mg/L. This high concentration of fluoride was also noted by Weir and Bader (1963, p. 45). Excessive fluoride in drinking water when used over a considerable span of time produces objectionable dental fluorosis (mottled teeth) in children that increases in severity with increases of fluoride concentration. According to McKee and Wolf (1963, table 6-5), concentrations of 2.0 to 3.0 mg/L produce moderate to severe mottling of teeth in children.

PUMPAGE AND WATER LEVELS

The pumpage by Kaiser Steel Corp. from Pinto Basin near observation well 3S/15E-4J1 was 2,700 acre-ft in calendar year 1976 and 3,000 acre-ft in calendar year 1977 (table 2). Since 1960, 49,300 acre-ft has been pumped for a yearly average of about 2,700 acre-ft (table 3).

Observation wells throughout Joshua Tree National Monument were measured semiannually to detect water-level changes. These water-level measurements are in table 4. In the Oasis of Mara (fig. 2), water-level measurements show seasonal fluctuations for the last 2 years. The general trend, however, is a slight decline in water level on both sides of the Pinto Mountain fault. In other areas of the monument (fig. 1), during the past 2 years water levels have risen in two wells, stayed about the same in two wells, and fallen in three wells. All these changes are small. The largest change is a decline of about 3 ft in well 1S/7E-27R1 (Willets Well). The water level in this well has shown a steady decline since 1966 and has fallen about 45 ft in 12 years. This water-level drop probably is caused by Barker Dam (fig. 1), approximately 6 mi upstream, which holds back surface-water runoff that eventually replenishes ground-water supplies in the Quail Wash area.

REFERENCES CITED

- Kunkel, Fred, 1963, Hydrologic and geologic reconnaissance of Pinto Basin, Joshua Tree National Monument, Riverside County, California: U.S. Geological Survey Water-Supply Paper 1475-0, p. 537-561.
- McKee, J. E., and Wolf, H. W., 1963, Water quality criteria: California State Water Resources Control Board, 548 p.
- National Academy of Sciences, National Academy of Engineering, 1972 [1974], Water quality criteria 1972: U.S. Government Printing Office, 594 p.
- Weir, J. E., Jr., and Bader, J. S., 1963, Ground water and related geology of Joshua Tree National Monument, California: U.S. Geological Survey open-file report, 123 p.

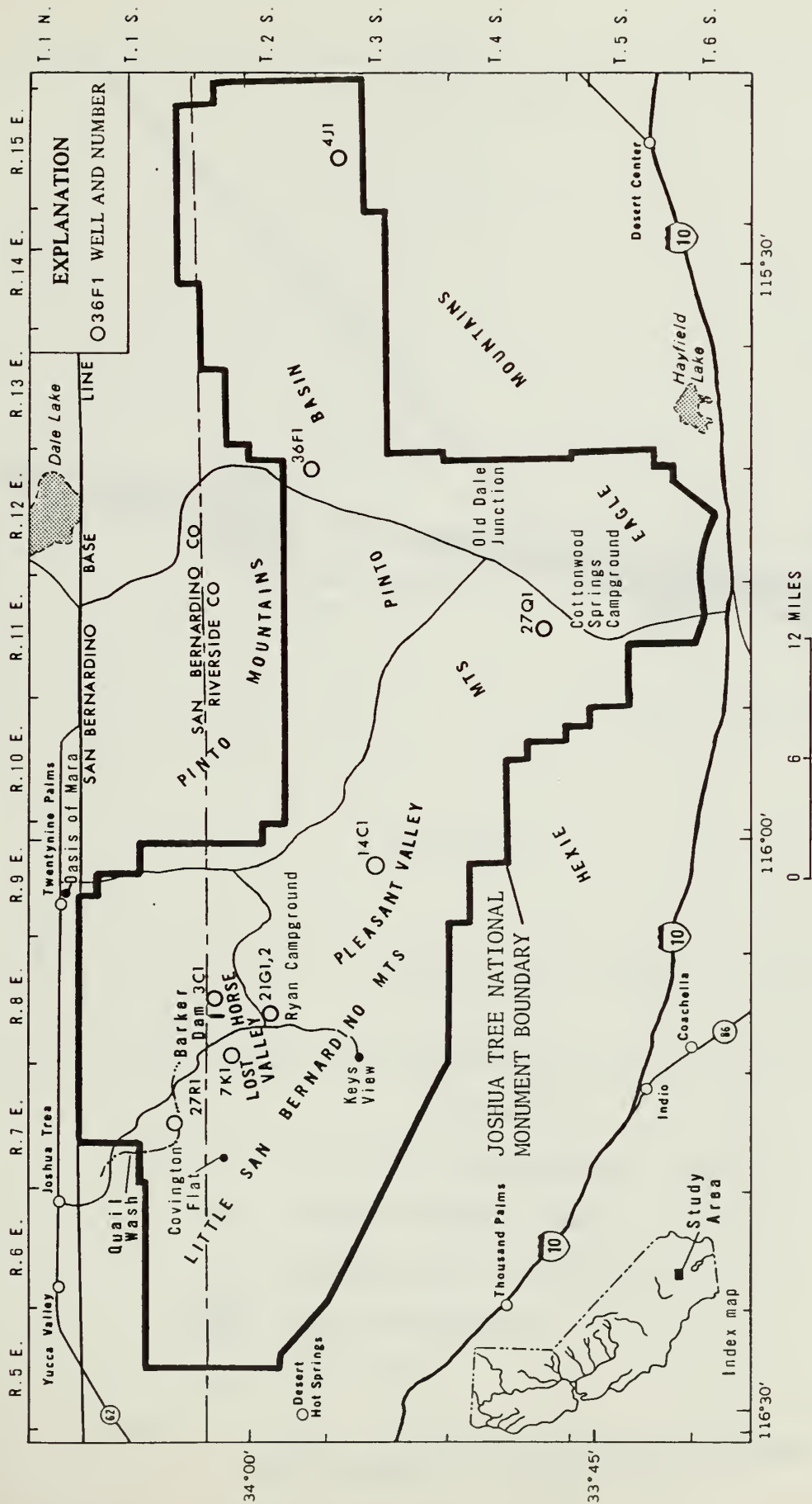
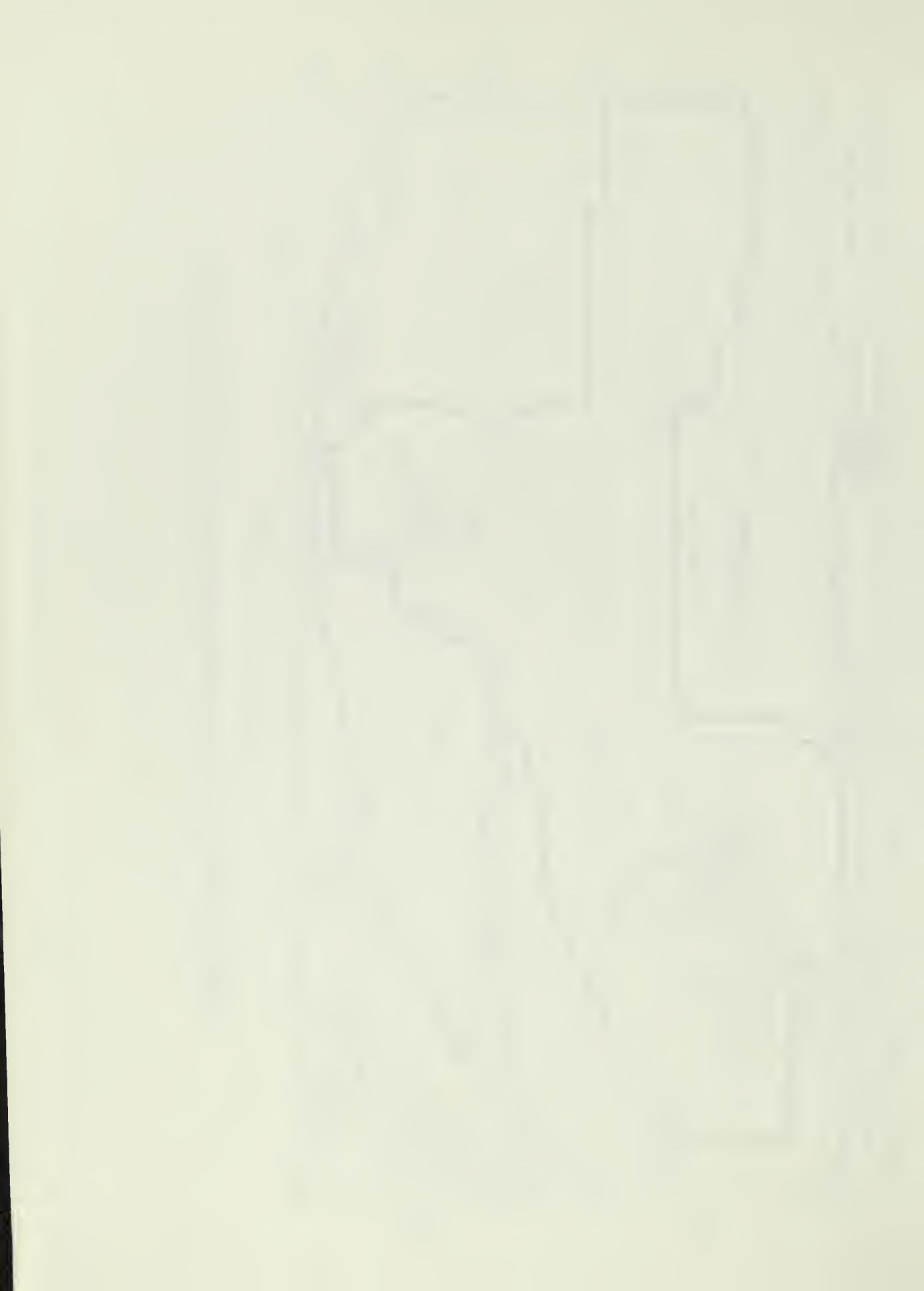
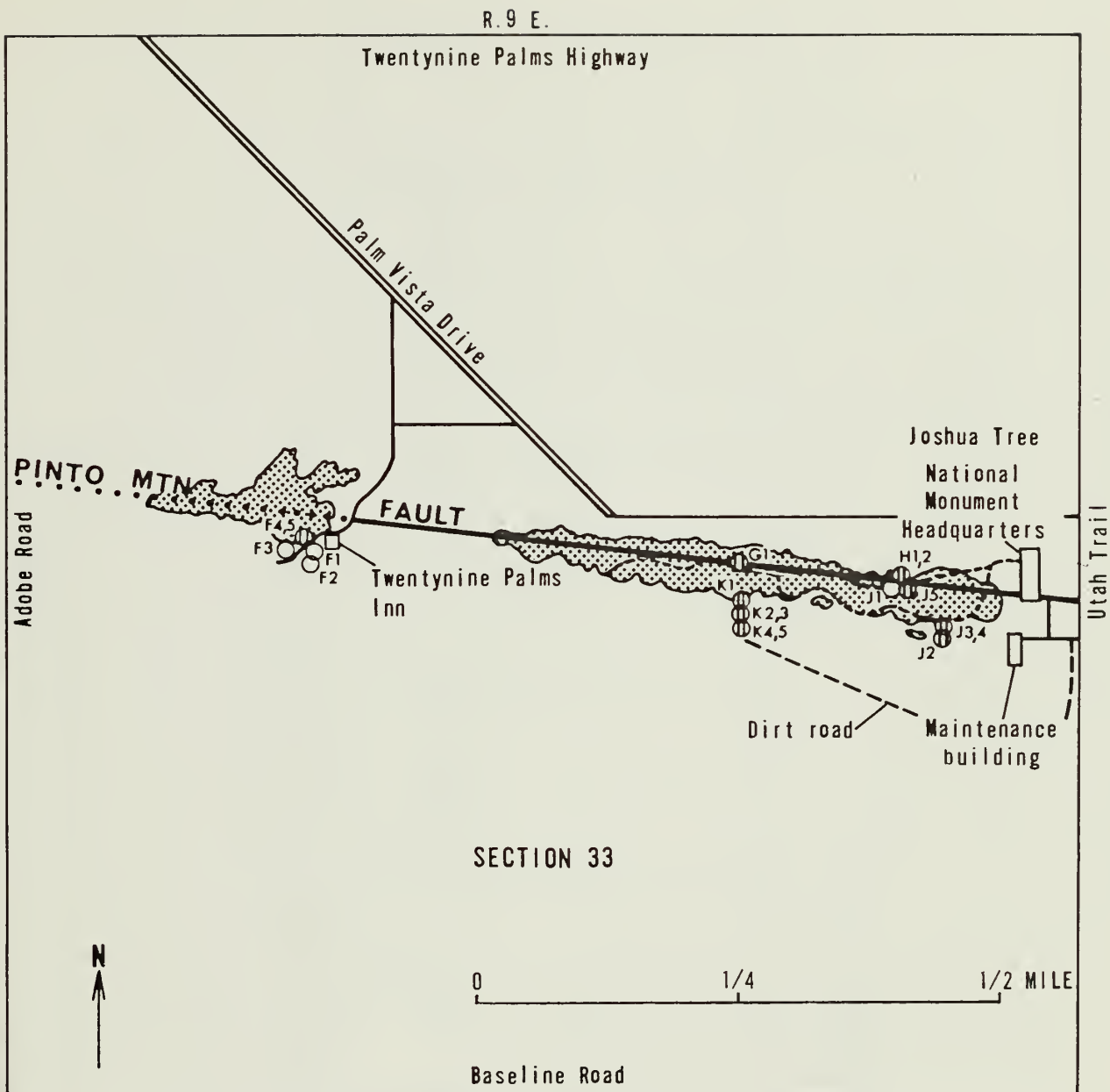


FIGURE 1.--Joshua Tree National Monument showing location of observation wells.





EXPLANATION

- . . . FAULT—Dotted where concealed or inferred
- ⊙^{K1} TEST WELL AND NUMBER—Augered in 1973-74
- ^{J1} WELL AND NUMBER—Existing prior to 1973
- ▨ AREA OF PHREATOPHYTES
- - - NATURE TRAIL

FIGURE 2.--The Oasis of Mara, Joshua Tree National Monument, showing location of observation wells.

TABLE 1.--Chemical analyses of ground water
[Constituents in milligrams per liter except iron and boron in micrograms per liter]

Well number	Date of sample	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (sum of constituents)	Hardness (Ca, Mg)	Percent sodium	Sodium adsorption ratio (SAR)	Specific conductance (micromhos)	pH	Water temperature (degrees C)	Boron (B)
23/SR-21C1 (SFS test Horse well no. 1) ¹	10-18-74 ²	31	50	42	11	37	1.1	190	0	29	23	0.8	0.18	269	150	35	1.3	439	7.8	19.5	130
	11-13-75 ²	26	40	42	9.8	32	1.1	190	0	29	24	.8	.21	261	150	32	1.2	440	--	18.5	160
	11-01-76 ³	26	20	40	9.3	33	1.2	180	0	32	24	.8	.40	256	140	34	1.2	420	--	19.5	110
	10-06-77 ⁴	23	--	41	10	35	1.2	180	0	33	21	.9	1.8	254	140	34	1.3	470	7.6	18.0	100
28/112-27Q1 (SFS Cottonwood well) ⁵	10-17-74 ²	33	40	38	8.3	42	2.0	140	0	25	39	2.6	1.4	268	130	41	1.6	445	8.0	26.5	150
	11-12-75 ²	21	50	33	7.0	38	1.5	140	0	24	39	2.3	1.4	235	110	42	1.6	400	--	21.0	120
	11-04-76 ³	25	40	34	6.5	39	1.6	140	0	26	39	2.7	.08	245	110	43	1.6	415	--	21.5	130
	10-05-77 ⁴	30	--	37	7.5	45	1.7	140	0	27	41	3.1	9.1	261	120	44	1.8	480	7.8	24.0	100

¹ Samples obtained with a thief sampler.
² Analyses by U.S. Geological Survey Laboratory, Salt Lake City, Utah.
³ Analyses by U.S. Geological Survey Laboratory, Denver, Colo.
⁴ Analyses by California Department of Water Resources Laboratory, Bryte, Calif.
⁵ Samples obtained when well was being pumped.

TABLE 2.--Pumpage from wells in Pinto Basin by Kaiser Steel Corp.
for calendar years 1976-77

[Metered in thousands of gallons, data furnished by Kaiser Steel Corp.
 (to convert from thousands of gallons to acre-feet divide by 325.8)]

	1976	1977	Total
January	53,733	44,595	98,328
February	59,769	62,363	122,132
March	76,473	69,360	145,833
April	79,615	75,411	155,026
May	83,432	78,953	162,385
June	89,130	93,221	182,351
July	89,560	92,014	181,574
August	81,472	171,922	253,394
September	63,664	71,904	135,568
October	76,932	78,742	155,674
November	65,964	75,853	141,817
December	73,523	59,873	133,396
Total ¹ (thousands of gallons)	893,000	974,000	1,870,000
Total ² (acre-feet)	2,700	3,000	5,700

¹Rounded to three significant figures.

²Rounded to two significant figures.

TABLE 3.--Yearly pumpage from wells in Pinto Basin by
Kaiser Steel Corp. for calendar years 1960-77¹.

[Metered in thousands of gallons, data furnished by Kaiser Steel Corp.
(to convert from thousands of gallons to acre-feet divide by 325.8)]

Year	Thousands of gallons ²	Acre-feet ³
1960	569,000	1,700
1961	630,000	1,900
1962	749,000	2,300
1963	1,190,000	3,600
1964	1,140,000	3,500
1965	969,000	3,000
1966	1,020,000	3,100
1967	1,090,000	3,300
1968	891,000	2,700
1969	949,000	2,900
1970	967,000	3,000
1971	846,000	2,600
1972	792,000	2,400
1973	833,000	2,600
1974	827,000	2,500
1975	819,000	2,500
1976	893,000	2,700
1977	974,000	3,000
Total	16,100,000	49,000

¹For pumpage prior to 1960, see Kunkel, 1963, p. 558.

²Rounded to three significant figures.

³Rounded to two significant figures.

TABLE 4.--Ground-water levels in observation wells

[Depth of well given in whole feet was reported by owner, driller, or other; depth given in tenths of a foot was measured below land-surface datum by the U.S. Geological Survey. Measurements are in feet below or above (+) the described point of reference]

Standardized footnotes

- a. Well being pumped.
 - b. Well pumped recently.
 - c. Nearby well being pumped.
 - d. Nearby well pumped recently.
 - e. Estimated.
 - f. Dry.
 - g. Measurement by outside agency or person.
 - h. Tape measurement.
 - i. Affected by outside influence (wind, atmospheric pressure, ocean tides, railroad trains).
 - j. Water level below sea level.
 - k. Measurement from recorder chart.
 - m. Obstruction in well above water surface.
 - n. No measurement.
-

State number 1S/7E-27R1 S Depth of well 182.0 ft. Altitude of land-surface datum 3,770 feet above mean sea level
Well-code number 340302N1161406.1 (55.5 m) (1,149 m)

Description of well: National Park Service (Willetts Well). In Quail Wash south of Joshua Tree (village) and west of Lost Horse Valley. Drilled unused well in alluvium, diameter 5 in (13 cm).

Records available	1958, 1961-	(25.17 m)	(53.30 m)
Highest water level	82.59 ft.	May 2, 1958	Lowest 174.86 ft. Oct. 6, 1977

All water levels are referenced to land-surface datum

1966			1967		1968		1969		1970	
Date	Water level		Date	Water level	Date	Water level	Date	Water level	Date	Water level
Mar. 1	129.75		Mar. 15	136.83	Apr. 4	(m)	Apr. 22	(m)	Apr. 8	160.98
Oct. 26	134.70		Oct. 25	(m)	Oct. 29	(m)	Oct. 24	159.4	Oct. 30	162.15

1971		1972		1973		1974		1975		State nu
Apr. 1	166.50	Jan. 28	164.80	Mar. 17	169.80	Feb. 26	169.12	Apr. 7	170.85	
		Jun. 15	165.74	Sep. 25	168.40	Oct. 18	170.20	Nov. 13	171.83	

1976		1977					LS/7E.
Mar, 25	172.11	Apr. 20	173.90				.
Nov, 4	173.07	Oct. 6	174.86				

[illegible]

State number	2S/8E-3C1 S	Depth of well	108	ft.	Altitude of land-surface datum	4,300	feet above mean sea level
Well-code number	340149N1160800.1		(53 m)		(1,311 m)		

Description of well: National Park Service (Queen well). South of the Wonderland of Rocks and about 2 mi (3 km) north of Sheep Pass. Dug unused well in residuum, diameter 6 ft (2 m).

Records available 1961, 1965-
Highest water level 91.99 ft. Oct. 25, 1967 Lowest 101.18 ft. Jun. 15, 1972
(28.04 m) (30.84 m)
All water levels are referenced to land-surface datum

1966		1967		1968		1969		1970	
Date	Water level	Date	Water level	Date	Water level	Date	Water level	Date	Water level
Mar. 1	95.74	Mar. 15	92.06	Apr. 5	94.60	Apr. 22	92.01	Apr. 8	92.50
Oct. 26	93.25	Oct. 25	91.99	Oct. 30	92.17	Oct. 24	92.28	Oct. 29	93.70

1971		1972		1973		1974		1975		State number
Apr. 1	92.99	Jan. 28	93.38	Mar. 17	98.61	Feb. 26	94.08	Apr. 8	94.44	
		Jun. 15	101.18	Sep. 25	94.07	Oct. 18	94.50	Nov. 13	94.65	

[illegible]

Copper Mountain Hydro Subunit (S-8.B0)

State number 20

(88 m)

Description of well:

(61.73 m)

Records available
1961-

All water levels are referenced to land-surface datum

1966			1967			1968			1969			1970		
Date	Water level		Date	Water level		Date	Water level		Date	Water level		Date	Water level	
Mar. 1	213.69		Mar. 15	214.93		Apr. 4	215.81		Apr. 22	216.65		Apr. 8	217.84	
Oct. 26	214.50		Oct. 25	215.46		Oct. 29	216.15		Oct. 24	216.80		Oct. 29	218.59	

1971		1972		1973		1974		1975		State number
Apr. 1	219.06	Jan. 27	220.31	Mar. 17	221.75	Feb. 26	223.18	Apr. 7	224.66	
		Jun. 15	220.80	Sep. 25	222.54	Oct. 18	224.09	Nov. 13	225.56	

[illegible]

All water levels are referenced to land-surface datum

[illegible]

AREA OR BASIN

Description of well:	
National Park Service (Dale Holmes well, Gold Rose well). In Pinto Basin, 1 mi (1.6 km) east of Gold Crown Road from Mission well. Drilled unused well in alluvium.	

Records available 1961-1974 (122.03 m) (125.0 m)
Highest water level 400.36 ft. Mar. 14, 1963 Lowest: 410.2 ft. Mar. 18, 1965
All water levels are referenced to land-surface datum.

1971		1972		1973		1974		1975
Mar. 31	400.93	Jan. 27	403.06	Apr. 26	401.31	Feb. 25	400.67	Measurements
		Jun. 15	402.05	Sep. 24	400.39			discontinued

State number

2S / 12E - 36F1 S

[illegible]

AREA OR BASIN
Pinto Hydro Subunit (X-17.CO)

1,080.6 feet above mean sea level
(529.4 m)

(529.4 m)

ser Steel Company's

cm). •

(51.64 m)

Oct. 5, 1977

169.43

4. 19

11.

8150

Highest water level

1954-

Records available

All water levels are referenced to land-surface datum

1966		1967		1968		1969		1970	
Date	Water level	Date	Water level	Date	Water level	Date	Water level	Date	Water level
Mar. 2	c161.95	Mar. 17	c163.38	Apr. 8	(n)	Apr. 23	(n)	May 2	c164.86
Oct. 27	c162.94	Oct. 26	c163.78	Nov. 7	(n)	Oct. 23	165.06	Oct. 28	c166.17

1971		1972		1973		1974		1975	
Mar. 31	c166.54	Jan. 27	c165.04	Mar. 17	c166.31	Feb. 25	c167.72	Apr. 7	c167.88
		Jun. 15	c165.57	Sen. 24	c167.72	Oct. 17	c167.48	Nov. 12	c168.00

[illegible]

AREA OR BASIN Pinto Hydro Subunit (X-17.CO)

Depth of well	402	ft.
---------------	-----	-----

Altitude of land-surface datum	2,957
--------------------------------	-------

Well-code number 334712N1154856.1

Description of well: National Park Service (Cottonwood well). In Smoketree Wash 3.5 mi (5.6 km) north of Cottonwood Spring. Drilled public supply well in alluvium, diameter 12 in (30 cm).

(51.90 m) (58.49 m)

(58.49 m)

Highest water level 170.29 ft.

Mar-12	19 59	Lowest	197 89	Jun-15	1972

All water levels are referenced to land-surface datum

1966		1967		1968		1969		1970	
Date	Water level	Date	Water level	Date	Water level	Date	Water level	Date	Water level
Mar. 3	179.44	Mar. 17	180.59	Apr. 5	183.04	Apr. 23	191.48	Apr. 8	188.87
Oct. 28	179.49	Oct. 26	181.84	Nov. 7	182.22	Oct. 23	187.26	Oct. 28	189.40

1971		1972		1973		1974		1975	
Mar. 31	188.87	Jan. 27	188.02	Mar. 15	188.62	Feb. 25	186.16	Apr. 8	191.15
		Jun. 15	191.89	Sep. 24	187.79	Oct. 17	188.49	Nov. 12	186.26

[illegible]

AREA OR BASIN
Twenty-nine Palms Hydro Subunit (X-9.A0)

Description of well: At Twentynine Palms Inn. Approximately 792 ft (241 m) inside entrance to Inn. Past office on dirt road and 20 ft (6 m) north of road on south edge of oasis sump. Augured 1-16-74.

Records available
1974-

1974			1975		1976		1977	
Date	Water level		Date	Water level	Date	Water level	Date	Water level
Jan. 17	9.1		Apr. 8	8.75	Mar. 26	8.64	Apr. 20	8.53
Mar. 20	8.75		Nov. 13	8.76	Nov. 5	8.59	Oct. 6	8.48
Sep. 27	8.82							

[illegible]

GROUND-WATER LEVELS IN OBSERVATION WELLS

CALIFORNIA COUNTY San Bernardino AREA OR BASIN Twenty-nine Palms Hydro Subunit (X-9.A0)

State number 1N/9E-33F5 S Depth of well 22 ft. Altitude of land-surface datum 1,981 feet above mean sea level.
Well-code number 340743N1160255.2 (604 m)

Description of well: At Twentynine Palms Inn. Approximately 792 ft (241 m) inside entrance to Inn. Past office on dirt road and 20 ft (6 m) north of road on south edge of oasis sump. Augured 1-16-74.

(2.67 m)

Records available 1974- _____ Highest water level 8.76 ft. Apr. 20, 1977 Lowest 9.28 ft. Sep. 27, 1974

All water levels are referenced to land-surface datum

1974			1975		1976		1977	
Date	Water level		Date	Water level	Date	Water level	Date	Water level
Jan. 17	9.08		Apr. 8	9.06	Mar. 26	8.89	Apr. 20	8.76
Mar. 20	9.01		Nov. 13	9.06	Nov. 5	8.82	Oct. 6	8.85
Sep. 27	9.28							

State number 1N/9E-33E5 S[illegible]

State number 1N/9E-33G1 S Depth of well 48 ft. Altitude of land-surface datum 1,961.91 feet above mean sea level
Well-code number: 340742N1160230.1 (15 m) (597.99 m)

Description of well: At Joshua Tree National Monument headquarters. Approximately 1,700 ft (518 m) west of Park headquarters along paved path on north side of oasis, approximately 2 ft (0.6 m) north of this path. Augured 12-5-73.

Records available 1974-1976
 Highest water level 31.29 ft. Nov. 13, 1975 Lowest 38.53 ft. Sep. 27, 1974
 (9.54 m) (11.74 m)
 All water levels are referenced to land-surface datum

1974		1975		1976			
Date	Water level	Date	Water level	Date	Water level	Date	Water level
Jan. 15	32.8	Apr. 8	32.09	Mar. 26	(m)		
Mar. 20	32.25	Nov. 13	31.29	Nov. 5	(m)		
Apr. 30	32.35						
Sep. 27	38.53						

State number 1N/9E-33G1 S

[illegible]

AREA OR BASIN
Twenty-nine Palms Hydro Subunit (X-9.AO)

Depth of well	77
---------------	----

77 ft. $\frac{\text{Altitude of land-surface datum}}{1,960.75 \text{ feet above mean sea level}}$
(23 m) (597.64 m)

Well-code number 340741N1160220.1

Description of well: At Joshua Tree National Monument headquarters. Approximately 650 ft (198 m) west of office, 78 ft (24 m) north of BM1 and 30 ft (9 m) west of large cottonwood tree at observation point.
Augured 1-15-74.

(15.89 m) (16.14 m)

Records available	1974-	Highest water level	52.14 ft.	Mar. 20, 1974	Lowest	52.96 ft.	Oct. 6, 1977
All water levels are referenced to land-surface datum							

State number 1N/9E-33U1 S

1974		1975		1976		1977	
Date	Water level	Date	Water level	Date	Water level	Date	Water level
Jan. 17	52.15	Apr. 8	52.33	Mar. 26	52.63	Apr. 20	52.83
Mar. 20	52.14	Nov. 13	52.52	Nov. 5	52.75	Oct. 6	52.96
Apr. 30	52.19						
Sep. 27	52.23						

[illegible]

GROUND-WATER LEVELS IN OBSERVATION WELLS

CALIFORNIA COUNTY San Bernardino

AREA OR BASIN Twentynine Palms Hydro Subunit (X-9.A0)

State number IN/9E-33H2 S

State number 1N/9E-33H2 S
Well-code number 340741N1160220.2

$$\text{Depth of well} \frac{55.6}{(16.9 \text{ m})} \text{ ft.}$$
$$\begin{array}{r} \text{Altitude of land-surface datum} \\ 1,960.75 \\ \hline (597.64 \text{ m}) \end{array}$$

Description of well: At Joshua Tree National Monument headquarters. Approximately 650 ft (198 m) west of office, 78 ft (24 m) north of BM1 and 30 ft (9 m) west of large cottonwood tree at observation point. Augured 1-15-74.

(15.55 m) (15.81 m)

1974 -	Highest water level	ft.	Mar. 20,	19 74	Lowest	51.86	Oct. 6	1977
Records available	51.01							

All water levels are referenced to land-surface datum.

1974		1975		1976		1977	
Date	Water level	Date	Water level	Date	Water level	Date	Water level
Mar. 20	51.01	Apr. 8	51.10	Mar. 26	51.49	Apr. 20	51.59
Apr. 30	51.51	Nov. 13	51.33	Nov. 5	51.64	Oct. 6	51.86
Sep. 27	51.14						

State number 1N/9E-33112 S

[illegible]

GROUND-WATER LEVELS IN OBSERVATION WELLS

CALIFORNIA COUNTY San Bernardino

AREA OR BASIN
Twenty-nine Palms Hydro Subunit (X-9.A0)

State number IN/9E-33J2 S

Depth of well	56.2	ft.
---------------	------	-----

Altitude of land-surface datum	1,973.27
1973.27	1973.27

State number	IN/9E-33J2 S
Well-code number	340738N1160217.1

$$\frac{1,973.27}{(601.45 \text{ m})}$$

Description of well: At Joshua Tree National Monument headquarters. Approximately 500 ft (152 m) west of maintenance building, 75 ft (23 m) south of southern paved path at oasis, 63 ft (19 m) south of wells J3 and J4. Augured 12-5-73.

Mar. 20 74 (5.20 m)

Mar. 20 74

Records available
1974-

Highest water level	15.64
---------------------	-------

15.64

17.05

Oct. 6 1977

All water levels are referenced to land-surface datum

1974			1975		1976		1977	
Date	Water level		Date	Water level	Date	Water level	Date	Water level
Jan. 15	15.94		Apr. 8	15.64	Mar. 26	16.01	Apr. 20	16.31
Mar. 20	15.64		Nov. 13	16.57	Nov. 5	16.82	Oct. 6	17.05
Apr. 30	15.70							
Sep. 27	16.17							

State number 1N/9E-33J2 S

[illegible]

CALIFORNIA

CALIFORNIA

State number

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Well-code n

Description

Description

Records available

Records available

Records available

Records available

Records available

Records available

	Date
	Jan. 1
	Mar. 2
	Apr. 3
	Sep. 2

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[illegible]

AREA OR EASIN Twentynine Palms Hvdro Subunit (X-9.A0)

Depth of well	26.5	ft.
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Altitude of land-surface datum	1,972.02
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(8.1 m)

1,972.02 feet above mean sea level
(601.07 m)

Description of well: At Joshua Tree National Monument headquarters. Approximately 500 ft (152 m) west of

maintenance building, approximately 10 ft (3 m) south of southern paved path around oasis.
Augured 12-5-75.

Highest water level	15.56
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(4.68 m)
15.56

(5.35 m)
17.48

	Apr. 8	1975	Lowest	17.48	Oct. 6	1977
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All water levels are referenced to land-surface datum

[illegible]

State number 1N/9E-33J4 S

GROUND-WATER LEVELS IN OBSERVATION WELLS

CALIFORNIA	COUNTY	San Bernardino	AREA OR EASIN	Twenty-nine Palms Hydro Subunit (X-9.AO)
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State number IN/9E-33K2 S
Well-code number 340739N1160230.1
Depth of well 37 ft. Altitude of land-surface datum 1,972.09 feet above mean sea level
(11 m) (601.09 m)

Description of well:	Remarks:
At Joshua Tree National Monument headquarters.	Approximately 1,700 ft (518 m) west of northwest corner of maintenance building, approximately 110 ft (34 m) north of dry wash, south of oasis;
middle of three test holes 50 ft (15 m) apart.	Augured 12-4-73.

(6.28 m) (9.61 m)

1973-
Highest water level 20.60 ft. Apr. 20, 1977 Lowest 31.52 ft. Dec. 4, 1973
All water levels are referenced to land-surface datum

1973		1974		1975		1976		1977	
Date	Water level	Date	Water level	Date	Water level	Date	Water level	Date	Water level
Dec. 4	31.52	Jan. 15	22.4	Apr. 8	21.55	Mar. 26	21.95	Apr. 20	20.60
		Jan. 17	22.45	Jul. 24	22.99	Nov. 5	23.84	Oct. 6	24.45
		Mar. 20	22.73	Nov. 13	21.73				
		Apr. 30	22.41						
		Sep. 27	24.07						

[illegible]

CALIFORNIA COUNTY San Bernardino

AREA OR BASIN
Twenty-nine Palms Hydro Subunit (X-9.A0)

State number 1N/9E-33K3 S

Depth of well $\frac{25}{(8)}$

$$\frac{\text{Altitude of land-surface datum}}{1,972.09} \quad \frac{\text{feet above mean sea level}}{(601.09 \text{ m})}$$

Well-code number 340739N1160230.2

Description of well: At Joshua Tree National Monument headquarters. Approximately 1,700 ft (518 m) west of northwest corner of maintenance building, approximately 110 ft (34 m) north of dry wash, south of oasis; middle of three test holes 50 ft (15 m) apart. Augured 12-4-75.

Records available 1973-

Year	Highest water level	Lowest water level
1997	21.02	19.85

Dec. 4, 1973	Lowest	24.46	Oct. 6, 1977
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(6.41 m)

(7.46 m)

1973			1974		1975		1976		1977	
Date	Water level		Date	Water level	Date	Water level	Date	Water level	Date	Water level
Dec. 4	21.02		Jan. 15	22.4	Apr. 8	21.53	Mar. 26	21.98	Apr. 20	21.87
			Jan. 17	22.41	Nov. 13	21.43	Nov. 5	(m)	Oct. 6	24.46
			Mar. 20	21.67						
			Apr. 30	21.61						
			Sep. 27	24.18						

State number 1N/9E-33K3 S

[illegible]

AREA OR BASIN Twentynine Palms Hydro Subunit (X-9.A0)

Depth of well	36.3	ft.
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Altitude of land-surface datum 1,973.13 feet above mean sea level
(601.41 m)

(11.1 m)

Description of well: At Joshua Tree National Monument headquarters. Approximately 1,700 ft (518 m) west of northwest corner of maintenance building, approximately 60 ft (18 m) north of dry wash, south of oasis. Southernmost of three test holes 50 ft (15 m) apart. Augured 12/4/73.

(6.86 m)

(7.62 m)

Station	Water level
Highest water level	22.50

Apr. 8 1975

lowest	24.99	“	Sep. 27	1974
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All water levels are referenced to land-surface datum

[illegible]

State number 1N/9E-33K4 S

AREA OR BASIN
Twentynine Palms Hydro Subunit (X-9.A0)

1,973.13 feet above mean sea level
(601.41 m)

$$\text{Depth of well} \quad \frac{27.6 \text{ ft.}}{(8.41 \text{ m})}$$

(6.85 m) (7.75 m)

Records available	1973-	Highest water level	22.48	ft.	Apr. 8	1975	Lowest	25.43	ft.	Oct. 6	1977
All water levels are referenced to land-surface datum											

State number 1N/9E-33K5 S

[illegible]

